



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/825,608

04/16/2004

Yun-Kwon Park

277/039

8053

27849

7590

10/19/2005

LEE & MORSE, P.C.

1101 WILSON BOULEVARD

SUITE 2000

ARLINGTON, VA 22209

EXAMINER

SUMMONS, BARBARA

ART UNIT

PAPER NUMBER

2817

DATE MAILED: 10/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

Office Action Summary	Application No. 10/825,608	Applicant(s) PARK ET AL.	
	Examiner Barbara Summons	Art Unit 2817	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 2 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 September 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☒ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) 1-6 and 18-23 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 7-17 and 24-31 is/are allowed.
- 6) ☐ Claim(s) _____ is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 1-31 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. <u>20051014</u> . |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>2/25/05 & 4/27/05</u> . | 6) <input type="checkbox"/> Other: _____. |

EX PARTE QUAYLE ACTION

Election/Restrictions

1. Applicant's election with traverse of the invention Group II (i.e. claims 7-17 and 24-31) in the reply filed on September 28, 2005 is acknowledged. The traversal is on the ground(s) that "the apparatus of Group I can be fabricated only through the process of Group II" because the alternative method the Examiner pointed out in the restriction requirement would have required different features including "a via hole" and that "the sacrificial layer... be etched through the via hole...and then closing the via hole" (see page 11 of the response). This is not found persuasive because it is irrelevant if the alternate method(s) of forming the apparatus require different or more intricate features/steps. The fact remains that the apparatus as claimed, can be made by another and materially different process, which Applicants apparently acknowledge in laying out the steps of the alternate process in their arguments. Because the apparatus as claimed can be made by another and materially different process, prior art that could be used to reject the finished claimed apparatus, may not necessarily be used to reject the claimed process of making the same, resulting in the requirement for two separate searches for the device and the method and a serious burden to the Examiner. Also, the apparatus and the method of making the same clearly have different classifications, which is further evidence of their distinctness (and that the searches are separate), which is not argued by Applicants.

Hence, the requirement is still deemed proper and is therefore made FINAL.

Art Unit: 2817

2. Claims 1-6 and 18-23 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on September 28, 2005.

Ex Parte Quayle

3. This application is in condition for allowance except for the following formal matters:

In the specification:

On page 15, on line 8, it appears that "AL₂O₂" should be - - Al₂O₂ - -.

On page 20, on the third line from the bottom, "6" should be - - 7 - - because it is Fig. 7 that shows the remaining film of the first substrate 210.

In the claims:

This application is in condition for allowance except for the above noted specification informalities and the presence of claims 1-6 and 18-23 to an invention non-elected with traverse in the reply filed on 9/28/05. Applicant is given Two Months (i.e. the Ex Parte Quayle response time as indicated below) from the date of this letter, to cancel the noted claims or take other appropriate action (37 CFR 1.144).

Prosecution on the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

A shortened statutory period for reply to this action is set to expire **TWO MONTHS** from the mailing date of this letter.

Suggested Title Change

4. The title of the invention is not descriptive of the elected invention. A new title is required that is clearly indicative of the invention to which the claims are directed. The Examiner suggests the following or something similar:

- - Fabricating Methods For Air-Gap Type FBARs and Duplexers Including
Securing A Resonating Part Substrate To A Cavity Forming Substrate - -.

(See claim 7, lines 3 and 6 and claim 24, lines 3-4 and 6-7).

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The closest prior art of record appears to be Bar-Sadeh et al. U.S. 6,894,383 which discloses forming a micro-electro-mechanical (MEMS) FBAR resonator filter (see the abstract) by securing a packaging substrate to a substrate that supports the resonators and then removing the resonator supporting substrate [see e.g. the abstract and Fig. 2B) which can then be further packaged with another packaging substrate. However, the reference does not show the dielectric layer or the removing portions of the dielectric layer (see claim 7, lines 4 and 10-11) or a duplexer (see claim 24, line 1) with an isolation part between two cavities (see claim 24, lines 6-8).

Ma et al. U.S. 2003/0189242 shows a similar structure with a lower substrate 24 (Fig. 2), supporting an FBAR resonator 32, secured to an upper semiconductor substrate wafer 14 (Fig. 3) with a cavity 42, and removing portions of the resonator support substrate 24 to form cavities 38 (see e.g. Figs. 1 and 6).

Whatmore et al. U.S. 2002/0121337 discloses an FBAR resonator filter formed on a substrate 27 (Fig. 5) and secured to a substrate 30 with cavities 32, but does not show removing the resonator support substrate after securing.

Wong et al. U.S. 6,713,314 discloses substrate 16 (Fig. 3) supporting an FBAR resonator secured/package with a capping substrate 10 on which another device 14 is formed.

Mang et al. JP 09-064675 discloses forming an FBAR resonator by using one substrate 10 with a cavity and another substrate 14 with only a dielectric layer 15 of the resonating part formed thereon (see the abstract and Figs. 2 and 3).

Tsai et al. U.S. 2002/0109564 discloses an FBAR resonator filter formed on one substrate 80 (Fig. 8) that is secured to a second cap substrate 80' with a cavity, but does not show removing the first substrate after the securing.

Tsai et al. U.S. 2002/0109430 shows a similar arrangement for an FBAR duplexer (see Figs. 4 and 6).

Ella et al. U.S. 6,509,813 shows a similar arrangement (see Fig. 9A).


Shim et al. U.S. 6,787,970 shows an FBAR resonator formed on a substrate 26 (see e.g. Fig. 1) and secured to a capping substrate 12 through which the resonator may be tuned.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Barbara Summons whose telephone number is (571) 272-1771. The examiner can normally be reached on M-Th, M-Fr.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bob Pascal can be reached on (571) 271-1769. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

bs
October 14, 2005


BARBARA SUMMONS
PRIMARY EXAMINER